CLAIMS

1. A process for the selective hydrogenation of at least one diolefinic compound contained in a feed, comprising the passage of a feed containing at least one diolefinic compound in contact with a catalyst composition, characterized in that said catalyst composition comprises at least one salt of a transition metal from groups IB, IIB, VB, VIB, VIIB and VIII of the periodic table, at least one ligand and at least one organometallic reducing agent.

2. A process according to claim 1, characterized in that:

- the transition metal salt is selected from halides, acetylacetonates and carboxylates of organic acids containing 2 to 25 carbon atoms;
- the reducing agent is selected from organometallic derivatives of at least one metal selected from the group formed by lithium, sodium and aluminium;
- the ligand is selected from derivatives of phosphorus, arsenic and antimony and nitrogen-containing ligands.

3. A process according to claim 2, characterized in that the carboxylate is selected from acetates, octoates, decanoates, naphthenates, stearates, palmitates, oleates and benzoates.

4. A process according to one of claims 1 to 3, characterized in that the transition metal salt is selected from salts of metals from groups IB, IIB, VIB and VIII of the periodic table.

5. A process according to claim 4, characterized in that the transition metal salt is selected from copper, zinc, chromium, molybdenum, iron, cobalt, nickel, ruthenium and palladium salts.

6. A process according to claim 5, characterized in that the transition metal salt is selected from iron salts.

7. A process according to one of claims 1 to 6, characterized in that the reactor is selected from:

- organoaluminas with general formula $AlR_y(X)_{3-y}$, in which R is an alkyl group, X is a halide and y=1, 2 or 3;
- magnesias with formula MgR_2, in which R is as defined above;
- aluminoxanes;
- sodium borohydride; and
- alkaline hydrides and their substitution derivatives comprising 1, 2 or 3 alkoxy groups.

8. A process according to one of claims 1 to 7, characterized in that the ligand derived from phosphorus, arsenic or antimony is selected from ligands with general formulae:

YR_mX_{3-m}, YR_3, $R_2Y\text{-}(CH_2)_nYR_2$, $Y(OR)_3$ and YOR_3,

in which Y=P, As or Sb, m=0, 1, 2 or 3; R = alkyl, aryl or substituted aryl; X = halogen, and n=0, 1, 2, 3 or 4.

9. A process according to one of claims 1 to 7, characterized in that the nitrogen-containing ligand is selected from amines, polyamines, imidazole, substituted imidazoles, pyrrole, substituted pyrroles, pyrazoles, amide derivatives, imines, diimines and pyridine derivatives.

10. A process according to one of claims 1 to 9 characterized in that a minor proportion of at least one salt of a further transition metal selected from metals from groups IB, VB, VIB, VIIB and VIII is added to the catalyst.

11. A process according to claim 10, characterized in that the principal metal is iron and the additional metal is selected from Co, Ni, Cu, Rh, Pd, Mn, Mo, W and V.

12. A process according to one of claims 1 to 11, characterized in that it is dissolved in at least one organic compound selected from aliphatic or aromatic hydrocarbons, ethers, esters, halogenated hydrocarbons, sulphoxides and amides.

13. A process according to one of claims 1 to 11, characterized in that it is dissolved in at least one ionic liquid with general formula $Q^+ A^-$ in which Q^+ represents a quaternary ammonium and/or quaternary phosphonium ion and A^- represents any anion which is capable of forming a liquid salt at low temperatures, i.e. below 90°C.

14. A process according to claim 13, characterized in that the quaternary ammonium and/or phosphonium ion Q^+ has one of the following general formulae:

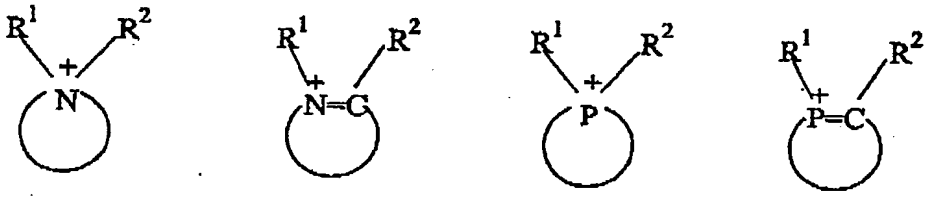
$NR^1R^2R^3R^{4+}$ and $PR^1R^2R^3R^{4+}$

or one of general formulae:

$R^1R^2N{=}CR^3R^{4+}$ and $R^1R^2P{=}CR^3R^{4+}$

in which R^1, R^2, R^3 and R^4, which may be identical or different, each represent hydrogen, the cation NH_4^+ being excluded for $NR^1R^2R^3R^{4+}$, or a hydrocarbyl residue containing 1 to 30 carbon atoms.

15. A process according to claim 13, characterized in that the quaternary ammonium and/or phosphonium ion Q^+ derives from a nitrogen-containing or phosphorus-containing heterocycle comprising 1, 2 or 3 nitrogen or phosphorus atoms, having one of the following general formulae:



in which the cycles are constituted by 4 to 10 atoms and R^1 and R^2, which may be identical or different, each represent hydrogen or a hydrocarbyl residue containing 1 to 30 carbon atoms.

16. A process according to claim 13, characterized in that the quaternary ammonium and/or phosphonium ion has one of the following formulae:

$R^1R^{2+}N{=}CR^3\text{-}R^5\text{-}R^3C{=}N^+R^1R^2$ or

$R^1R^{2+}P=CR^3-R^5-R^3C=P^+R^1R^2$

in which R^1, R^2 and R^3, which may be identical or different, each represent hydrogen or a hydrocarbyl residue containing 1 to 30 carbon atoms and R^5 represents an alkylene or phenylene residue.

17. A process according to one of claims 1 to 16, characterized in that the mole ratio between the ligand and the transition metal salt is in the range 0.5/1 to 10/1.

18. A process according to one of claims 1 to 16, characterized in that the ligand is monocoordinating and the ligand/transition metal salt mole ratio is 2/1 to 3/1.

19. A process according to one of claims 1 to 17, characterized in that the ligand is bi-coordinating and the ligand/transition metal salt mole ratio is 1/1 to 1.5/1.

20. A process according to one of claims 1 to 18, characterized in that the mole ratio between the reducing agent and the transition metal salt is 1/1 to 15/1.

21. A process according to one of claims 1 to 20, characterized in that said catalyst composition is employed in a proportion corresponding to a proportion of metallic compounds in the reaction medium of 10 to 10000 ppm by weight.

22. A process according to one of claims 1 to 21, characterized in that said feed is a C_4 cut comprising 1,3-butadiene.

23. An integrated process for producing 1-butene from a 1-butene rich C_4 cut, characterized in that it comprises, as the finishing step, selective hydrogenation of 1,3-butadiene carried out using a process according to claim 22 to obtain a 1,3-butadiene content of less than 10 ppm by weight.